

REMARKSObjections to the drawings

FIGs. 1-4 have been objected to as not being appropriately labeled as prior art. Applicant has submitted substitute four drawing sheets for these figures that include this moniker, and therefore requests that the objections be withdrawn.

Claim rejections under 35 USC 102 as to Hasegawa

Claims 1-10 and 16-20 have been rejected under 35 USC 102(b) as being anticipated by Hasegawa (5,700,601). Claims 1 and 16 are independent claims, from which claims 2-10 and 17-20 ultimately depend. Applicant has amended claims 1 and 16 so that they better indicate what is the subject invention. Applicant asserts that amended claims 1 and 16 are not anticipated by Hasegawa, such that claims 2-10 and 17-20 are not anticipated by Hasegawa for at least the same reasons.

Claim 1 as amended is directed in its preamble to "an off-axis illumination (OAI) photomask for OAI semiconductor photolithography processing." Applicant submits that Hasegawa does not anticipate claim 1 at least because it does not disclose a photomask that can be use during OAI photolithography. Rather, Hasegawa is directed to producing a phase-shift mask (PSM), which is a photomask that in the terms of Hasegawa has a "phase shifter" layer such that "the phase angles of light beams passing through respective areas [of the mask] are different from each other." (Abstract) OAI, however, does not employ PSM's, but rather employs standard photomasks in which the phase angles of light beams are not manipulated. Instead, OAI uses light that is directed at an off-angle, and not at a perpendicular angle, to the photomask in question. Therefore, regardless of what Hasegawa discloses, it cannot anticipate the invention of claim 1, because its photomasks are phase-shift masks, and not off-axis illumination photomasks, as to which claim 1 is specifically directed.

Applicant notes that the preamble to a claim is to be accorded "the import that the claim as a whole suggests for it." (MPEP, sec. 2111.02) More specifically, "[i]f the claim preamble,

when read in the context of the entire claim, . . . ‘is necessary to give life meaning, and vitality’ to the claim, then the claim preamble should be construed as if in the balance of the claim.” (*Id.*)

The MPEP additionally cites *Kropa v. Robie*, 187 F.2d 150 (CCPA 1951), as providing an example that is particularly apt in the context of the preambles of claims 1, 11, and 15.

A preamble reciting “An abrasive article” was deemed essential to point out the invention defined by claims The court stated that “it is only by that phrase that it can be known that the subject matter defined by the claims is comprised as an ‘abrasive article.’ . . .” Therefore, the preamble served to further define the structure of the article produced.

(MPEP, sec. 2111.02) Similarly, it is by the phrase “an off-axis illumination (OAI) photomask for OAI semiconductor photolithography processing” that it can be known that the subject matter defined by claim 1 is directed to OAI photomasks.

Furthermore, both claims 1 and 16 as amended are limited to photomasks having *transparent* substrates, *opaque* non-dense contacts, and *opaque* assist features. Hasegawa does not disclose a photomask having a transparent substrate, and opaque non-dense contacts and assist features, however. Rather, the non-dense contact, or “main pattern,” is “formed of a transparent area” within a substrate that is a “semitransparent area formed of a semitransparent film.” (Abstract) The assist features, or auxiliary patterns, are likewise “transparent auxiliary features.” (Abstract) Hasegawa thus does not anticipate claims 1 and 16 as have been amended.

Applicant notes that Hasegawa could not be modified so that its main and auxiliary patterns are opaque, rather than transparent, and so that its substrate is transparent, instead of semitransparent. This is because Hasegawa’s photomasks are phase-shift masks (PSM’s), as has been noted. PSM’s operate by having various transparent and semitransparent layers so that the phases of the light beams impinging them are altered. If Hasegawa’s main and auxiliary patterns were made opaque, and its substrate were made transparent, then Hasegawa’s photomasks would cease to function as PSM’s, and would cease to modify the phases of the light beams impinging them. That is, Hasegawa would cease to work as intended.

Applicant notes in this respect that the MPEP states that “the proposed modification cannot render the prior art unsatisfactory for its intended purpose.” (MPEP 2143.01). That is, “[i]f [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, *then there is no suggestion or motivation to make the proposed modification.*” (*Id.*, citing *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984)) (Emphasis added) Furthermore, “the proposed modification cannot change the principle of operation of a reference.” (MPEP 2143.01) That is, “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are *not* sufficient to render the claims *prima facie* obvious.” (*Id.*, citing *In re Ratti*, 270 F.2d 810 (CCPA 1959)) (Emphasis added) Therefore, Hasegawa could not be modified so that its patterns are opaque and so that its substrate is transparent.

Claim rejections under 35 USC 102 as to Yasuzato

Claims 1-15 have been rejected under 35 USC 102(b) as being anticipated by Yasuzato (6,004,699). Claims 1 and 11 are independent claims, from which claims 2-10 and 12-15 ultimately depend. Applicant has amended claims 1 and 11 so that they better indicate what is the subject invention. Applicant asserts that amended claims 1 and 11 are not anticipated by Yasuzato, such that claims 2-10 and 12-15 are not anticipated by Yasuzato for at least the same reasons.

Claims 1 and 11 as amended are limited to photomasks having non-dense contacts that are “isolated and/or random.” That is, claims 1 and 11 have been amended so that non-dense contacts that are specifically *semi-dense* are no longer included within the subject invention. Yasuzato does not disclose a photomask having non-dense contacts that are isolated and/or random. Rather, as admitted by the Examiner, Yasuzato specifically discloses contacts that are “semi-dense.” Because claims 1 and 11 have been amended so that semi-dense contacts are no longer claimed, Yasuzato cannot anticipate claims 1 and 11.

Furthermore, Yasuzato cannot be modified so that its semi-dense contacts are instead isolated contacts and/or random contacts. Yasuzato applies to a particular type of illumination photolithography known as four-point illumination. Within four-point illumination, light is passed through “mutually adjacent,” or semi-dense, contacts or “patterns,” in the terminology of Yasuzato. (Abstract) That is, in four-point illumination, you have to have both a “first main pattern,” or contact and “a second main pattern,” or contact, as known within the art. Such “main patterns” or contacts thus can at most be semi-dense, and can never be random or isolated, since there are always at least two such contacts near one another. In other words, the contacts or main patterns “repeat[] at prescribed intervals.” (Col. 4, l. 36) If Yasuzato’s photomask contacts were isolated and/or random, and not at least semi-dense, Yasuzato’s photomask would not work as intended with four-point illumination.

As has been noted above in relation to Hasegawa, the MPEP states that “the proposed modification cannot render the prior art unsatisfactory for its intended purpose.” (MPEP 2143.01) That is, “[i]f [the] proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, *then there is no suggestion or motivation to make the proposed modification.*” (*Id.*, citing *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984)) (Emphasis added) Furthermore, “the proposed modification cannot change the principle of operation of a reference.” (MPEP 2143.01) That is, “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are *not* sufficient to render the claims *prima facie* obvious.” (*Id.*, citing *In re Ratti*, 270 F.2d 810 (CCPA 1959)) (Emphasis added) Therefore, Yasuzato could not be modified so that its patterns are isolated and/or random.

Claim rejections under 35 USC 103

Claims 11-15 have been rejected under 35 USC 103(a) as being unpatentable over Hasegawa in view of the admitted prior art. Claim 11 is an independent claim, from which claims 12-15 ultimately depend. Applicant submits that, as amended, claim 11 is not rendered

obvious over Hasegawa in view of the admitted prior art, such that claims 12-15 are not rendered obvious over Hasegawa in view of the admitted prior art for at least the same reasons.

Claim 11 has been amended so that it is limited to photomasks having *transparent* substrates, *opaque* non-dense contacts, and *opaque* assist features. As described in relation to claims 1 and 16, however, Hasegawa alone does not disclose such photomasks. Therefore, Hasegawa in view of the admitted prior art does not disclose such photomasks, either. Furthermore, Hasegawa in view of the admitted prior art could not be modified to disclose photomasks having transparent substrates and opaque non-dense contacts and assist features, as doing so would destroy the intended operability of Hasegawa in particular, as has already been described above in detail in relation to claims 1 and 16. Hasegawa in view of the admitted prior art therefore does not and cannot teach, suggest, or disclose the invention of amended claim 11.

In addition, Hasegawa is not combinable with the admitted prior art. The admitted prior art teaches off-axis illumination (OAI) photolithography employing traditional photomasks, whereas Hasegawa is specifically concerned with phase-shift photolithography employing phase-shift masks (PSM's). OAI photolithography is different than photolithography that employs PSM's, as has been described above in relation to claim 1, because OAI photolithography does not manipulate the phase angles of light beams, and employs light that is directed at an off-angle, which are both in contradistinction to photolithography employing PSM's. The PSM's of Hasegawa thus cannot be combined with the OAI photolithography of the admitted prior art, and *prima facie* obviousness with respect to claim 11, therefore, cannot be established.

Conclusion

~~Applicant has made a diligent effort to place the pending claims in condition for~~
allowance, and request that they so be allowed. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Randy Tung,

Yu

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Applicant's Attorney, at 248-540-4040, so that such issues may be resolved as expeditiously as possible. For these reasons, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

A handwritten signature in black ink, appearing to be "Randy Tung", is written over a horizontal line. The signature is stylized with a large, loopy initial "R" and a trailing flourish.

Randy Tung (31,311)